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Abstract

A description is given of quasi-automated techniques used to increase students' motivation to improve reading rate and study skills in a University of Minnesota adult extension course for study improvement. Essentially the students are taught techniques of self-applied reward and punishment of their own choosing. The reinforcer is some stimulus which increases the probability of a certain behavior in the future. By ranking behaviors, the chance to engage in the higher probability behavior is used to increase the lower probability behavior. The effects of the psychology of public commitment are also utilized. The role of the teacher-counselor in this type of instrumented motivation is to function as an information disseminator and discussion leader. Five case studies are presented and reviewed in the light of the research studies of Premack and Lewin. References are included. (WB)

PRINCIPLES OF SELF-REWARD FOR STUDY SKILLS

by

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At the last meeting of this conference, I presented a paper on automated diagnosis (Wark, 1968). I described a validated system using tape-recorded instructions and the necessary pencil and paper forms with which a college student could diagnose his own reading difficulties and embark on the appropriate individualized treatment. I suggested that the Automated Individualized Diagnosis system was about "as competent as a well-trained but nervous graduate student conducting his first few intake interviews." Of course, a graduate student becomes more efficient and competent as time goes by. However, the fact that we can train an inanimate system to do as good a job as a human counselor should not be dismissed disdainfully. In certain administrative situations, when there are not enough competent human beings around to handle the load, a machine system that mimicks human behavior may be a very useful adjunct. The sensitive mix of technology and human concern may make both more efficient.

In this paper, I want to report on some quasi-automated techniques that have proven effective in increasing student's motivation to improve rate and study skills. I submit and will demonstrate that it is possible to increase the efficiency of a counselor manyfold by training students to use these techniques.

The Effects of Self-applied Reward and Punishment

In the University of Minnesota Evening Extension course in How-to-Study, students are taught to reward or punish themselves for effective or noneffective study behavior. These students range as broadly as do typical students in an extension division. Thus, in any given class, there may be 17-year-old dropouts and"rather elderly" school teachers picking up credits for advancement or learning new techniques to use in the classroom. There will be a sprinkling of college graduates getting skills refresher preparatory to going back to graduate school and lower management types in the skilled trades planning to go on to college. In this rather varied context of student needs and abilities, the demands of the instructor-counselor are quite varied. One objective of the course is to teach the students to function independently in analyzing their own study behavior and taking responsibility for changing it.

Students are taught initially to time themselves while reading a text book. The behavior of interest is reading rate measured with a simple kitchen timer. This information, converted to a words/minute graph serves as a base rate. Later in the course, the students are given instructions in the techniques of self-reward and self-punishment. They are requested as part of the course to apply these techniques to increase rate, study time, or strengthen a number of desirable study habits. The behavior's contingencies and payoffs are chosen by the students themselves. The instructor functions merely as a consultant. Let us turn to case reports of this procedure as a way of modifying study behavior (Wark, in press).

CASE # 1. Margaret is a 35-year-old Sister in a religious teaching order. She holds a B.S. degree. She feels that she has problems separating major and minor details in her own reading. She tends to be meticulous and careful in her work.

Prior to the modification procedure her study reading was about 100 words a minute without underlining. Her recreational reading rate was initially quite high. Her results are presented in Figure 1.

We note that under the contract her study type reading, including underlining, increased in speed. However, she herself pointed out that within a given hour of reading her study rate accelerates and then drops whereas recreational reading continues to increase. However, she felt the contract was a distinct improvement in her study behavior.

Figure 1. about here

CASE # 2. Terry is an 18-year-old and unemployed. On the initial night of class he reported his main problem as getting started on home work. Starting on the 20th of September and continuing until the 18th of November, Terry submitted no home work. Although threatened with dismissal from class, he produced nothing. On the 18th of November after group discussion, he decided to use 15 minutes of rock and roll music as a reward for five minutes of text reading. A contract was signed and witnessed by his classmates with a certain seriousness and formality.

Figure 2. about here

Terry presented his chart to the class at the next meeting. The other students expressed their obvious approval. Following the presentation, Terry, previously quite shy and mute, participated in class and continued to be a lively contributor. He reports that now he no longer needs to use the music as a reinforcer for study.

CASE # 3. Jane is a 23-year-old college graduate. Her high school achievement put her in the upper quarter, but her tested ability was in the lowest quarter for University of Minnesota students. She enrolled in a course to improve her reading speed, comprehension and concentration. Her hobby interests include training a German shepherd for obedience trials. Initially, she set the terms such that for every 20 pages she would walk her dog one mile. Because of her interest in training this was a satisfying, rewarding situation for her. She charted her rate of reading and presented the results in Figure 3.

Figure 3. about here

We note that after the contract was placed in effect there was a slight initial drop. When the rate had stabilized she entered into a second contract involving a higher criterion. The results are presented in Figure 4.

Figure 4. about here

The first segment of Figure 4. is a base rate from the contract summarized in Figure 3. Under the new contract in segment A for 40 pages she would walk her dog one and one-half miles. She found minimal effects. At that point, she instigated a new contract in segment B, an avoidance situation. Gaiting involves running the dog and is somewhat aversive to her. This resulted in an immediate jump in her rate.

CASE # 4. Wayne is a 25-year-old high school graduate with some college experience. He reports he has trouble getting started with study. He works as a supervisor for a section of clerical personnel.

His selected contingency was to wear a rather disreputable sport coat if he did not put in a full 60 minutes of study each night. His case is summarized in Figure 5.

Figure 5. about here

The effect took hold only after his subordinates kidded him about his dress. In the week after submitting the graph he reports obtaining a good 60 minutes study period merely by hanging the sport coat over his desk.

CASE # 5. Mary is a 32-year-old high school graduate with one and one-half years of junior college. She is a trained X-Ray technologist. She chain-smoked during the class hour. She decided to use smoking as a contingency in improving her reading rate. Her contract reported, in Figure 6, took hold almost immediately.

Figure 6. about here

The Theoretical Basis for Self-Control

Let us examine some of the theoretical background for the cases that have just been presented. Reinforcement is a fundamental concept. A reinforcer (or a reward as it is less technically called) is some stimulus which increases the probability of a certain behavior in the future. So for example, a hungry pigeon may be presented with two lighted disks, one red and one white. Each time he pecks at the red target, he gets access to food (a new stimulus) for a short period. When he pecks at the white disk, both disks go blank for a few seconds. We find after a short time that the pigeon pecks almost continuously at the red disk. We say that the behavior has been reinforced since it becomes more probable each time the pigeon gets food for pecking that he will peck at the red disk in the future. We also say that pecking the white disk has become extinguished since it drops out of his behavior. This is a very crude overview of operant conditioning techniques. For a more detailed explanation, see Holland and Skinner (1961). This same reinforcing technique has been applied to behavior changes in all sorts of organisms, from flatworms to Harvard sophomores.

Most of the work in the early reinforcement research used rather basic biological rewards. Skinner worked with hungry rats and pigeons. Other people have worked with thirsty organisms. The various reinfor-

cers for experimental research have been food, water, and on occasion, sex. These three rewards are easily manipulated in a psychological laboratory. However, it is rather difficult to use them when working with normal, uncontrolled, human beings. Relatively few people are willing to go hungry, thirsty, or celibate merely to learn how to read faster. Fortunately, some rather interesting research by David Premack (1959) enabled us to extend the concept of a reinforcer in a very important way.

Premack starts with the observation that for any given person, some behaviors are more probable than other behaviors. Thus, in one study he found that some children would rather play with a pinball machine than eat candy, while another group of youngsters would rather eat candy than play with the pinball. He presented both the pinball machine and the candy dispenser and let the children do as they would. He was thus able to gather base rate information for the probabilities of these two behaviors. Then he demonstrates very effectively that once two behaviors have been ranked in terms of preference for a particular person the opportunity to engage in the higher probability behavior can reinforce or increase the probability of engaging in the lower probability behavior. Thus, he found that some children, who would rather eat candy than play pinball, could be encouraged to do more pinball playing if everytime they played with the pinball machine they earned a chance to eat some candy. All well and good. Everybody knows that little kids will do things to get candy.

The interesting case was that of the other group of youngsters. These are the youngsters who would prefer to play the pinball machine.

By appropriate control of the contingencies, Premack changed their behavior. In order to get a chance at the pinball machine, the kids had to eat a piece of chocolate. It was a sort of psychological force-feeding but it was most impressive in demonstrating the new set of reinforcers.

Premack thus took us far beyond the limits of food, water, and sex when dealing with human beings. He suggested that a reinforcer can be a chance to do some high probability behavior. Once any two behaviors were ranked, the chance to engage in the higher probability behavior could be used to increase the lower probability behavior. If you want a good homemade analog you might think of the usual situation at mealtime with regard to rutabagas and ice cream. The way to get the kid to eat his rutabaga is to hold the ice cream until after the rutabagas are gone. Of course, if there were some perverse little monsters that preferred rutabaga, the contingencies could be shifted.

Another relevant area of research, central to the problem of self-control of behavior, has to do with the effects of the social psychology of public committment. Shortly before his death, the eminent social psychologist Kurt Lewin summarized a series of studies designed to change the attitude of housewives towards various kinds of new foods (1952). Once these attitudes had been manipulated it would be possible to measure the change in food habits that followed. Thus, we have an area in which social psychological techniques would be used to change behavior. Any results could be applied to the field of reading and study skills.

Lewin studied first of all the problems related to increasing positive

attitude towards "variety meats." In the context of the study, and at the time when the study was performed (the meat rationing days of World War II), variety meats meant beef hearts, sweetbreads, and kidneys. These particular items of bovine delicacy, while they were very nutritious and inexpensive, were not looked upon with great favor. The time was done well before the days of Julia Child. Thus, he found that after a control condition lecture on the advantages of variety meats only 3% of the homemaker audience changed their cooking patterns. In the experimental situation the same kind of information was presented, stressing the value of variety meats. But the initial emphasis was on "other housewives like themselves." During the course of the discussion, the emphasis shifted from "other housewives" to a more personal "how would you feel?" At the end of the meeting, the women were asked by a showing of hands who was willing to try one of the meats within the next week. The names of the people volunteering were not recorded. However, on a two week follow-up, 32% of the people were seen to be eating "variety meats." This was opposed to the 3% who changed their eating behavior on the basis of a pure lecture.

Lewin reports other attempts to change food-related behavior. He compared lectures and individual instruction with the method of group decision by a show of hands. He found that merely making a public commitment was terribly important. Thus in teaching new mothers to give cod liver oil and orange juice to their infants, personal, individual instruction produced only 15% compliance after four weeks. But, after a group discussion, and public decision, compliance was much enhanced. Two weeks later, 45% of the mothers had changed their behavior. Four weeks later, the percent of compliant mothers had

jumped to 50%.

Analysis of the Five Cases in the Light of Relevant Research

If we look now at the cases in the light of the research that has just been summarized, we get some insight as to the mechanisms for the reported behavior changes. Some of the cases were obviously using a straight reinforcement situation. But notice that none of the cases involved Skinner's basic reinforcers - water, food, or sex. Sister Margaret, and Terry were both on a type of Premack schedule. Both decided what they would prefer to do rather than read and then made reading the price for that higher probability behavior. Terry made the situation more effective by engaging in a formal contract. In other words, he used public commitment to strengthen his own intention to change. Without his self-commitment it's unlikely that any kind of behavior modification techniques would work. However, it seems likely that he made similar resolutions in the past which did not produce changes in behavior. Apparently what is significant here is his own commitment, plus a specific consequence for that behavior, plus the social pressure engendered when other students witnessed his contract. Thus we have a combination of Premack and Lewin. Jane used a straight reward situation, again using something she would prefer to do as the reward for something that was a little less desirable. Wayne, using his old sport coat, was engaging in strictly social pressure. And we notice that the effect did not take over until other people became significant in mediating that pressure. Thus, it was not until the co-workers complained about his sport coat that he showed the appropriate jump in behavior.

Finally, there is the interesting situation of self-application of punishment. Mary, and Jane in her second contract, increased their reading using a punishing situation. Mary had to give up something that she wanted and Jane had to avoid doing something that she didn't want under the terms of her contract. In both cases, the effect was quite marked.

It is worth noting that the contract notion is of course nothing more than a formally organized, instrumented type of public commitment. Thus Lewin's research is directly relevant.

SUMMARY

What we have then is a type of instrumented motivation. Certain research findings, relevant to reinforcement, preference, and social control are brought to bear upon a significant area of human behavior - reading and study skills. The counselor functions merely as an information disseminator and discussion leader. The student must make the choice of what he wants to do and what he will use as his payoff for doing it. Once this agreement has been made, and formalized, motivation seems to increase.

What if the contract is not carried out? What then does the counselor do? He helps the student modify the contract. If the cost was too high or the punishment not great enough, he must renegotiate the contract with his student. On the one hand it is a problem of keeping the student from biting off more than he can chew. On the other hand, it is preventing the student from being too severe with himself. It is not as automatic as the tape-recording but the procedures can be thought of as another way of instrumenting the significant area of human behavior.

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TERRY

NAME: TERRY

BEHAVIOR: START DOING HOMEWORK

CONTRACT SIGNED IN CLASS 11/18: 5 PAGES TEXT
FOR 15 MINUTES OF MUSIC

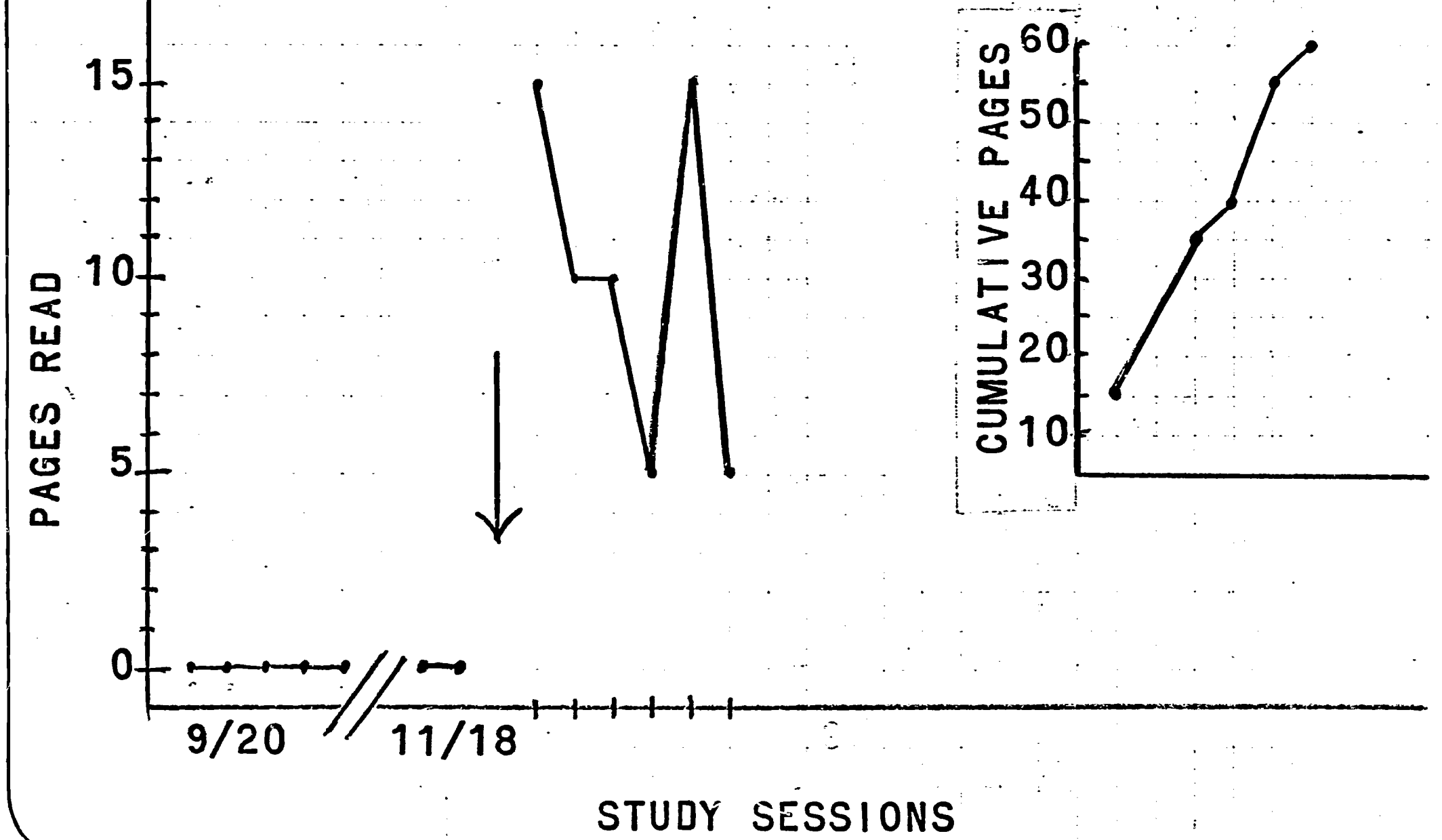
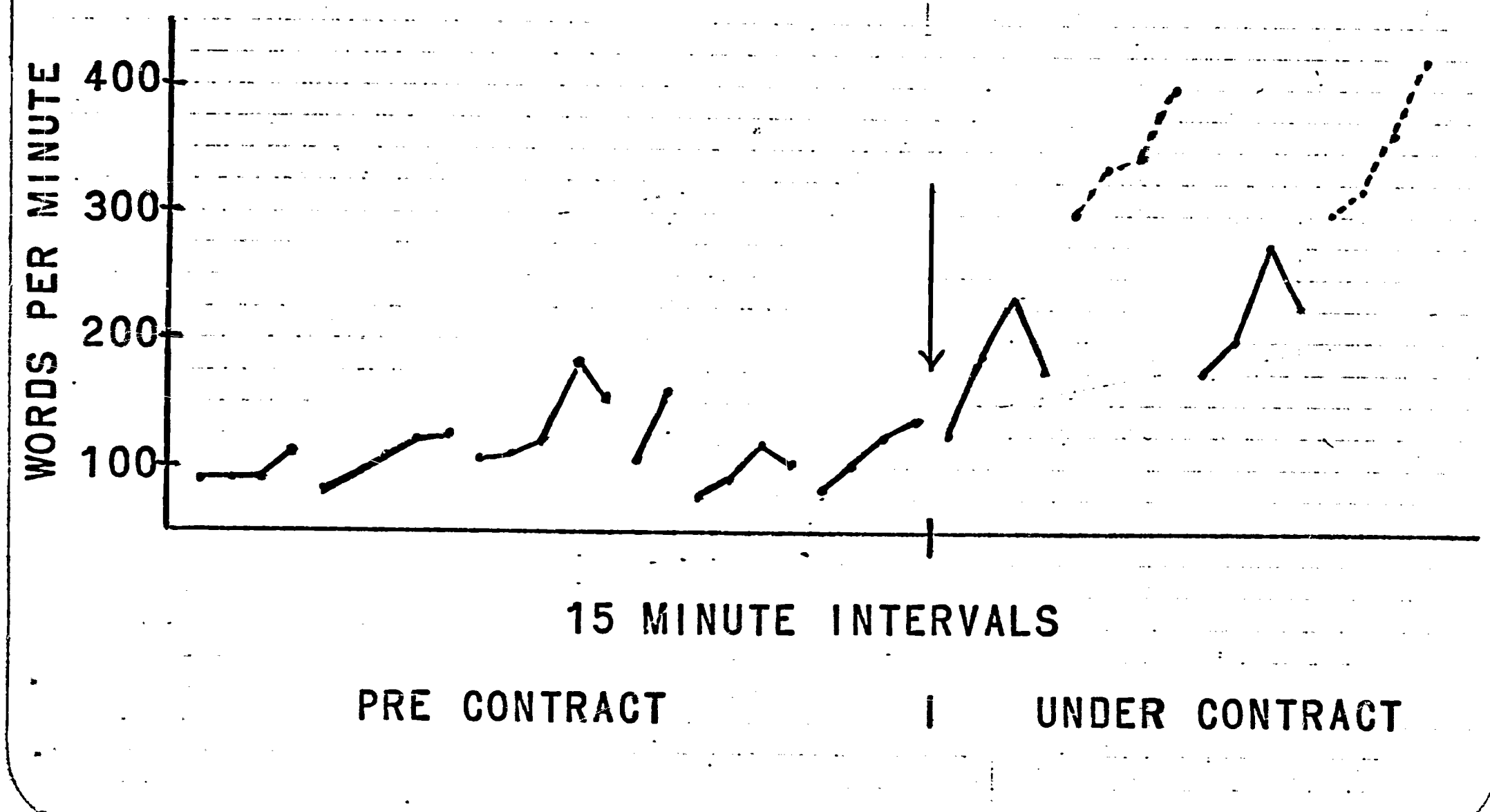


fig 1

NAME: SISTER MARGARET

BEHAVIOR: INCREASE RATE

CONTRACT: FOR 1 PAGE TEXT UNDERLINED_____
READ 2 PAGES RECREATION-----



TERRY

V

fig 2

NAME: TERRY

BEHAVIOR: START DOING HOMEWORK

CONTRACT SIGNED IN CLASS 11/18: 5 PAGES TEXT
FOR 15 MINUTES OF MUSIC

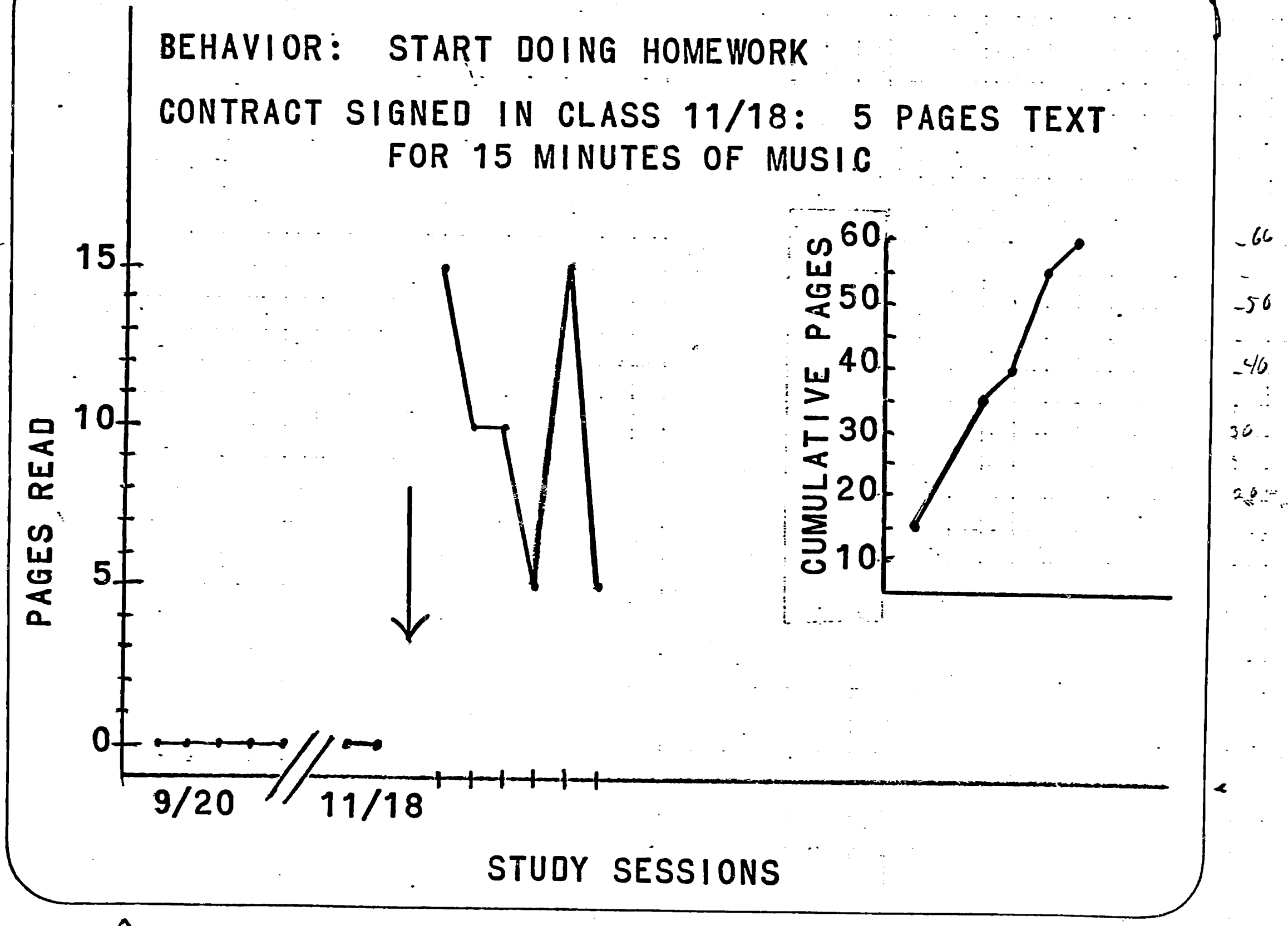


fig 3

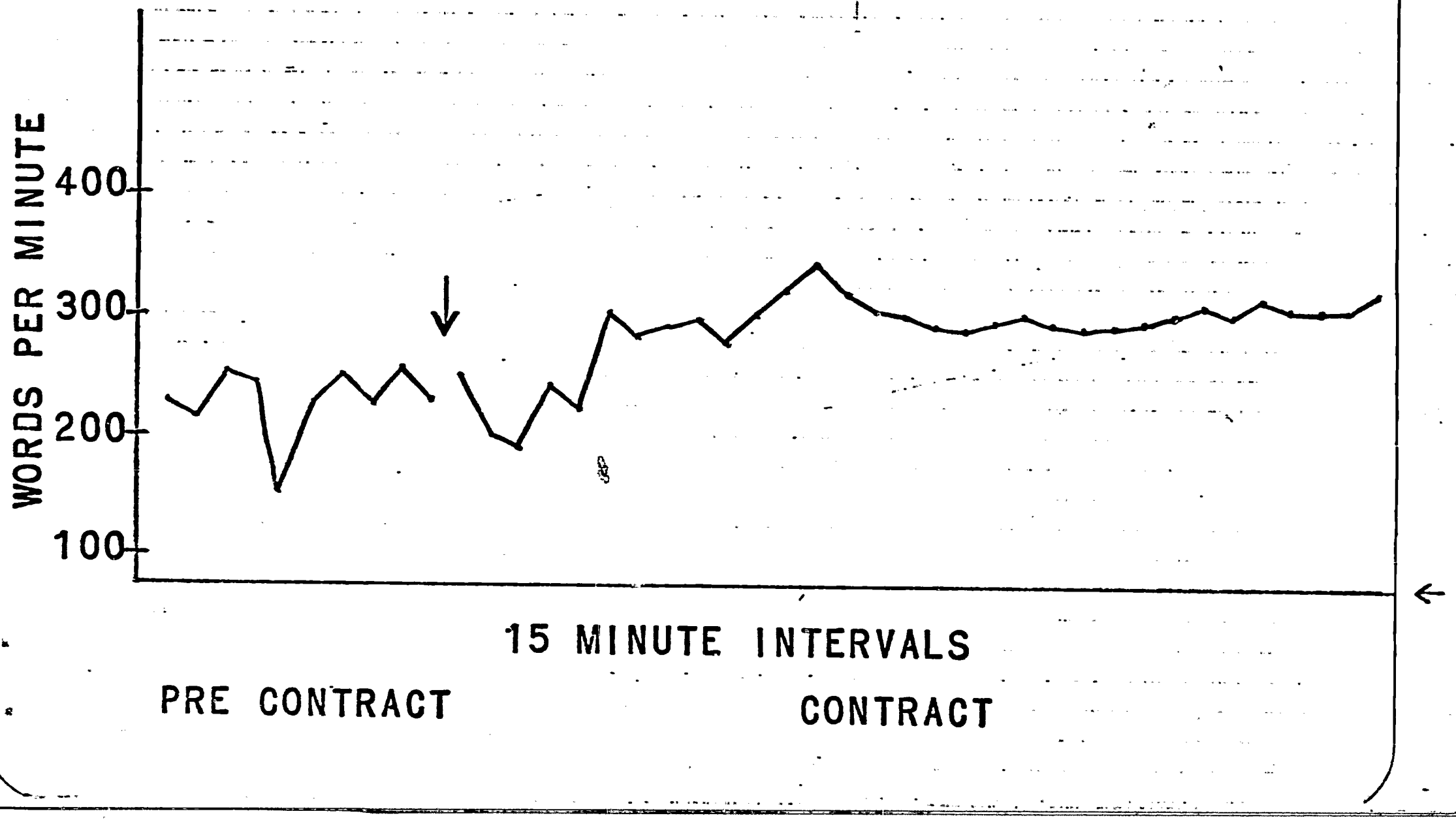
JANE

JANE
I
3

NAME: JANE

BEHAVIOR: FASTER READING

CONTRACT: FOR EVERY 20 PAGES, WALK DOG 1 MILE



JANE II

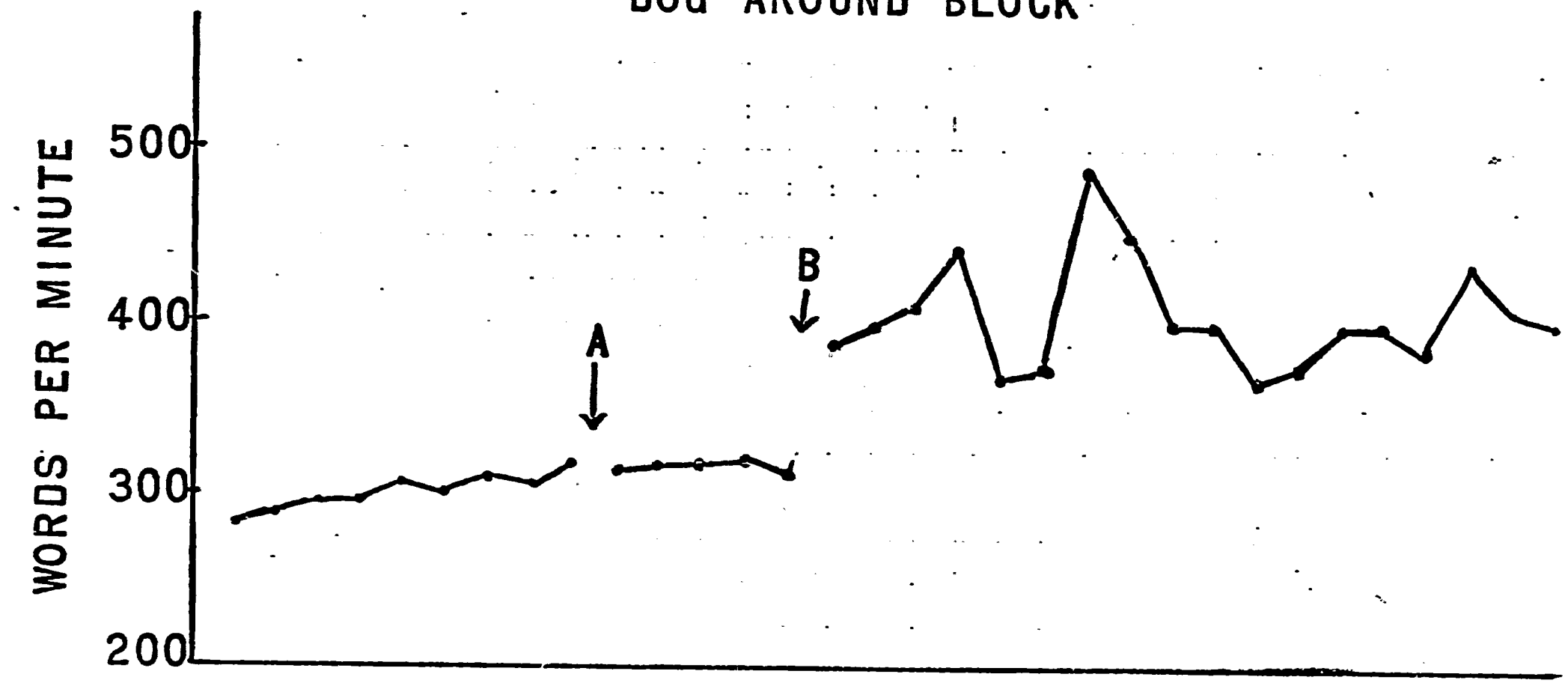
C

fig 4

NAME: JANE

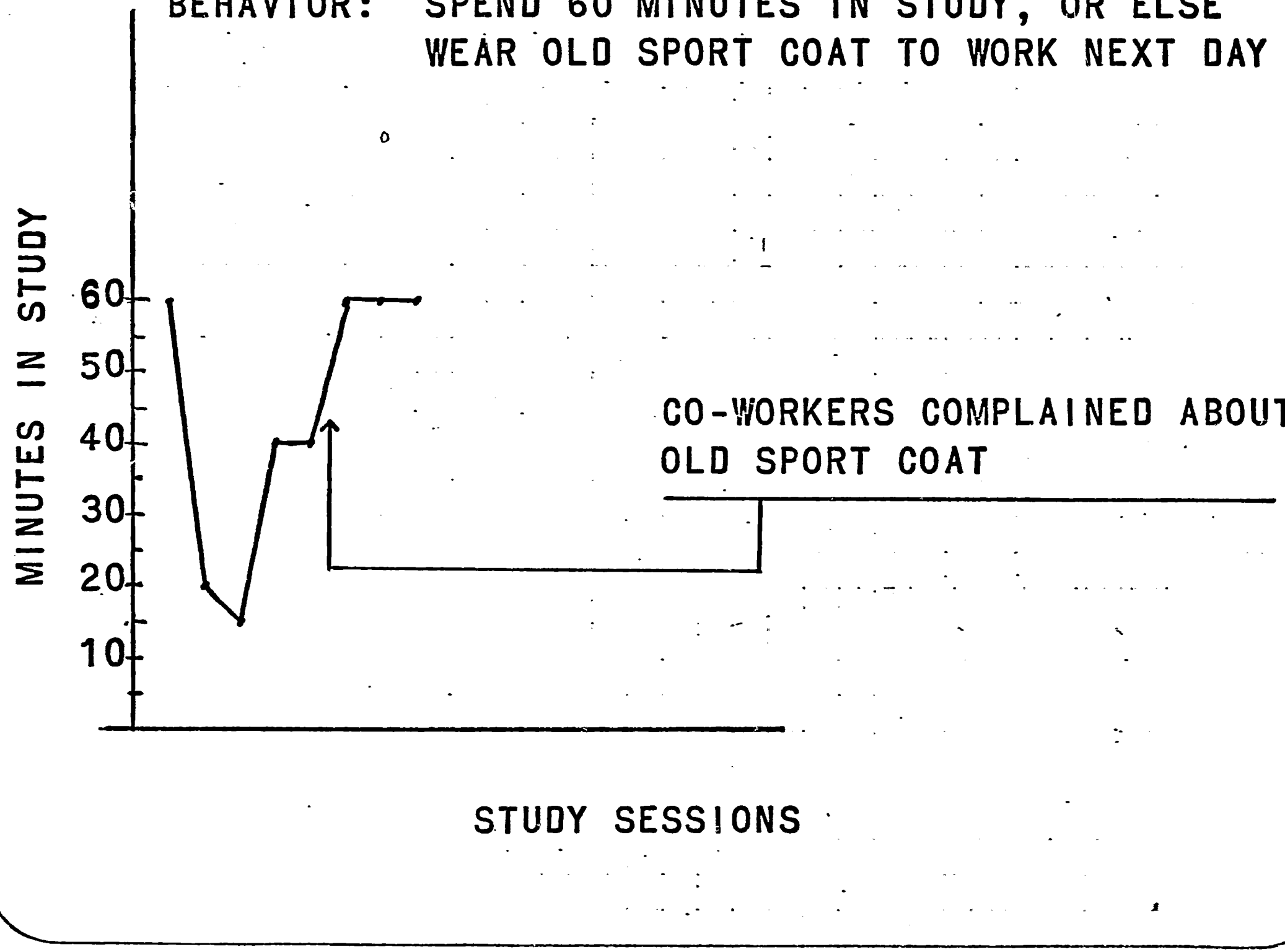
BEHAVIOR: FASTER READING

CONTRACT: A FOR 40 PAGES, WALK DOG 1½ MILES
B IF RATE BELOW 300 W/M, MUST GAIT DOG AROUND BLOCK



NAME: WAYNE

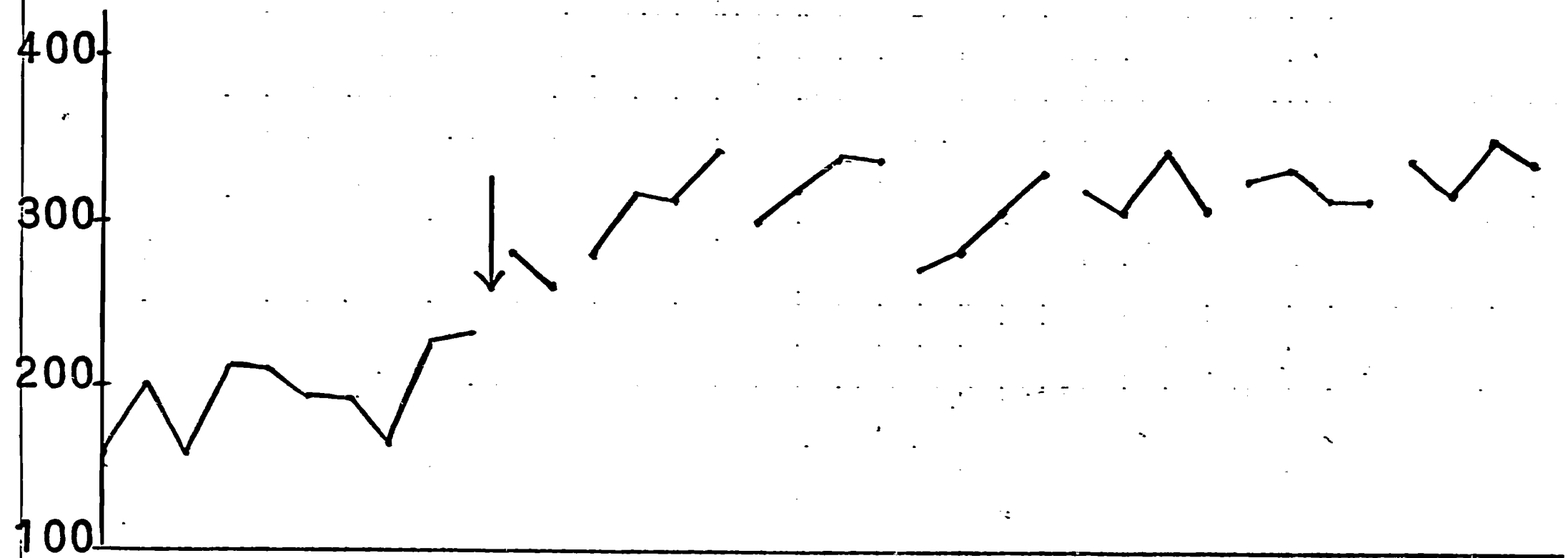
BEHAVIOR: SPEND 60 MINUTES IN STUDY, OR ELSE WEAR OLD SPORT COAT TO WORK NEXT DAY



NAME: MARY

BEHAVIOR: FASTER STUDY RATE

CONTRACT: IF RATE GOES BELOW 300 W/M THEN NO SMOKING FOR NEXT HOUR



	PRE CONTRACT					UNDER CONTRACT	
$\bar{X}$	195.70	273	313	325	296	320	320	337